

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

NOTES ON BASE

This is one map in a series of topographic map sheets covering the entire surface of Mars at nominal scales of 1:25,000,000 and 1:5,000,000 (Batson, 1973; 1976). The major source of map data was the Mariner 9 television experiment (Mausky and others, 1970).

ADOPTED FIGURE

The figure of Mars used for the computation of the map projection is an oblate spheroid (flattening of 1/192) with an equatorial radius of 3393.4 km and a polar radius of 3375.7 km. This is not the height datum, which is defined below under the heading "Contours".

PROJECTION

The Lambert conformal conic projection is used for this sheet with standard parallels at 35°S and 59.2°S. A scale of 1:4,336,000 at lat 30°S was chosen to match the scale at lat 30°S of the adjacent Mercator projection. Longitudes increase to the west in accordance with usage of the International Astronomical Union (IAU, 1971). Latitudes are areographic (de Foucault and others, 1973).

CONTROL

Planimetric control is provided by photogrammetric triangulation using Mariner 9 pictures (Davies, 1973; Davies and Arthur, 1973) and the radio-tracked position of the spacecraft. The first meridian passes through the crater Airy-Cul 5 (19° S) within the crater Airy. No simple statement is possible for the precision, but local consistency is about 10 km.

MAPPING TECHNIQUE

A series of mosaics of Lambert conformal conic projections of Mariner 9 pictures was assembled at 1:5,000,000.

Shaded relief was copied from the mosaics and portrayed with uniform illumination with the sun to the west, using airbrush techniques described by Inge (1972) and Inge and Bridges (1976). To improve portrayal, various computer enhancements of many pictures besides those in the base mosaic were used. Computer enhancement of Mariner 9 pictures is described by Lovell and others, 1973; and Green and others, 1973. Viking orbiter pictures were also examined and used where they significantly clarified Mariner 9 image data. No attempt was made to portray all information in the Viking pictures, however.

Shaded relief analysis and representation were made by Patricia M. Bridges.

ALBEDO MARKINGS

The markings superimposed on the shaded relief were hand copied from Mariner 9 pictures that were computer enhanced especially to show low-frequency tone variation (Batson and Inge, 1976). The surface in these pictures is illuminated from a variety of angles from the camera line of sight. The markings therefore delineate boundaries of local brightness variations only and should not be considered as a true measure of albedo. No attempt was made to use Earth-based telescopic albedo data.

Airbrush portrayal of albedo markings was done by Patricia M. Bridges.

CONTOURS

Since Mars has no seas and hence no sea level, the datum (the 0 km contour line) for altitudes is defined by a gravity field described by spherical harmonics of fourth order and fourth degree (Jordan and Lorell, 1973) combined with a 6.1-millibar atmospheric pressure surface derived from radio-occultation data (Kjore and others, 1973; Christensen, 1975; Wu, 1975).

The contour lines on most of the Mars maps (Wu, 1975) were compiled from Earth-based radar determinations (Downs and others, 1971; Pettengill and others, 1971) and measurements made by Mariner 9 instrumentation, including the ultraviolet spectrometer (Hord and others, 1974), infrared interferometer spectrometer (Conrath and others, 1973), and stereoscopic Mariner 9 television pictures (Wu and others, 1973).

Formal analysis of the accuracy of topographic elevation information has not been made. The estimated vertical accuracy of each source of data indicates a probable error of 1-2 km.

COLOR

No attempt was made on the map to duplicate precisely the color of the Martian surface, although the color used does approximate it.

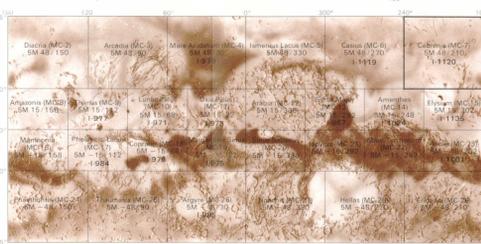
NOMENCLATURE

All names on this sheet are approved by the International Astronomical Union (IAU, 1974), except Hrad Vallis, which is provisional. Double and triple letter designations for craters refer to position on the map and are derived from a grid based on equidistant meridians and parallels; the alphabet (Q and O omitted) runs in the direction of increasing longitude (W) and latitude (N). The complete designation of a crater is the name of the quadrangle followed by a double or triple letter. The prefix 'CB' (identifying the Cebrenia quadrangle) is part of the complete designation but, for brevity, is not shown on most craters. Some craters have commemorative names; letter designations for these craters are shown in parentheses. Where craters lie mostly on an adjoining map, their letters are derived from the other map; where craters lie exactly on the boundary of two maps, their letters are derived from the eastern or southern map.

MC-7: Abbreviation for Mars Chart T, M 5M 48/210 RMC; Abbreviation for Mars 1:5,000,000 series; center of sheet lat 48° N, long 210° W; shaded relief map, R, with albedo markings, M, and contour, C.

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Quadrangle location
Number preceded by 1 refers to published topographic map

INDEX TO MARINER 9 PICTURES USED TO MAKE THE ALBEDO MARKINGS OVERLAY

Most of the pictures indexed above were specially processed to accentuate albedo markings. Only the useful image areas of the pictures are outlined.

Index No.	DAS No.	Index No.	DAS No.
1	1180101	15	883844
2	1180102	16	891084
3	1180103	17	892394
4	1180104	18	900660
5	1180105	19	906860
6	1180106	20	918844
7	1180107	21	927084
8	1210267	22	883884
9	1210268	23	891084
10	1220396	24	895054
11	891074	25	905444
12	895024	26	912684
13	905124	27	918824
14	918726	28	927024

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Index No.	DAS No.	Index No.	DAS No.
1	122041	2	88A21
3	122A43	4	21817
5	122A45	6	21819
7	122A47	8	21821
9	122A49	10	21823
11	122A51	12	21825
13	122A53	14	21827
15	122A55	16	21829
17	122A57	18	21831
19	122A59	20	21833
21	122A61	22	21835
23	122A63	24	21837
25	122A65	26	21839
27	122A67	28	21841
29	122A69	30	21843
31	122A71	32	21845
33	122A73	34	21847
35	122A75	36	21849
37	122A77	38	21851
39	122A79	40	21853
41	122A81	42	21855
43	122A83	44	21857
45	122A85	46	21859
47	122A87	48	21861
49	122A89	50	21863
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65	122A05	66	21879
67	122A07	68	21881
69	122A09	70	21883
71	122A11	72	21885
73	122A13	74	21887
75	122A15	76	21889
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83	122A23	84	21897
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97	122A37	98	21911
99	122A39	100	21913
101	122A41	102	21915
103	122A43	104	21917
105	122A45	106	21919
107	122A47	108	21921
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303	122A43	304	22117
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313			